

SpaceOps 2010 Abstract Cover Page

Title: Controlling Infrastructure Costs: Right-Sizing the Mission Control Infrastructure

Presenter: Keith Martin

Authors: Keith Martin
NASA, System Architect, Johnson Space Center

Michael Sen-Roy
Tietronix, System Architect, Johnson Space Center

Jennifer Heiman
Tietronix, System Architect, Johnson Space Center

Contact: Keith Martin
NASA - Johnson Space Center
2101 NASA Parkway
DD12
Houston, TX 77058
Keith.d.martin@nasa.gov
281-483-6003

Focus Issue: infrastructure TCO

Controlling Infrastructure Costs: Right-Sizing the Mission Control Facility

Johnson Space Center's Mission Control Center is a space vehicle, space program agnostic facility. The current operational design is essentially identical to the original facility architecture that was developed and deployed in the mid-90's. In an effort to streamline the support costs of the mission critical facility, the Mission Operations Division (MOD) of Johnson Space Center (JSC) has sponsored an exploratory project to evaluate and inject current state-of-the-practice Information Technology (IT) tools, processes and technology into legacy operations.

The general push in the IT industry has been trending towards a data-centric compute infrastructure for the past several years. Organizations facing challenges with facility operations costs are turning to creative solutions combining hardware consolidation, virtualization and remote access to meet and exceed performance, security, and availability requirements. The Operations Technology Facility (OTF) organization at the Johnson Space Center has been chartered to build and evaluate a parallel Mission Control infrastructure, replacing the existing, thick-client distributed computing model and network architecture with a data center model utilizing virtualization to provide the MCC Infrastructure as a Service.

The OTF will design a replacement architecture for the Mission Control Facility, leveraging hardware consolidation through the use of blade servers, increasing utilization rates for compute platforms through virtualization while expanding connectivity options through the deployment of secure remote access. The architecture demonstrates the maturity of the technologies generally available in industry today and the ability to successfully abstract the tightly coupled relationship between thick-client software and legacy hardware into a hardware agnostic "Infrastructure as a Service" capability that can scale to meet future requirements of new space programs and spacecraft.

This paper discusses the benefits and difficulties that a migration to cloud-based computing philosophies has uncovered when compared to the legacy Mission Control Center architecture. The team consists of system and software engineers with extensive experience with the MCC infrastructure and software currently used to support the International Space Station (ISS) and Space Shuttle program (SSP).

Keywords: virtualization, TCO, data center

Abstract Bullets:

- MCC Software
- Preserve Software/Network architecture
- Performance
- H/W consolidation
- Hardware RMA
- H/W agnostic
- Management
- Downtime / Maintenance
- Clones / Golden Image
- Security
- Secure Remote Access
- Vehicle/Program Agnostic

Goal:

Better ROI for MCC facility Infrastructure

How – Datacenter Approach

- H/W Consolidation
- Virtualization
- Infrastructure as a Service

Constraints

- Preserve current compute architecture
 - o Software
 - o Network
- Meet or exceed current compute performance
- Transition costs are minimized
 - o Software Re-cert
 - o Hardware platform Re-cert
 - o Training Costs
 - o